Marquette County Road Commission Response to MDEQ Questions for the Proposed CR 595 Project

June 6, 2012

Pursuant to the requests by the Michigan Department of Environmental Quality (MDEQ), the following items of clarification regarding the application for permit for CR 595 (MDEQ File No. 11-52-0075-P) are provided:

1.0 Width of Wetland to be Cleared along the ROW but not Otherwise Impacted.

Wetland fill sections will be cleared to 10 feet beyond the slope-stake line (i.e. the outer edge of the proposed fill slope).

2.0 Average Width of Peat Excavation.

Attachment A is a spreadsheet that provides clarification of the average width of peat (organic soil) excavation at each wetland crossing proposed for CR 595. The spreadsheet also includes temporary wetland impacts that may result from the excavation of peat prior to placement of wetland fill to construct the road base. The Michigan Department of Transportation (MDOT) specifications for peat excavation are the basis for the peat excavation plans for CR 595. Attachment 1 is Detail Sheet E from the Plan & Profile Drawings as revised, incorporating those MDOT specifications.

3.0 Clarification and Further Explanation of Mulligan Plains West vs. CR 595 Costs.

To add to the explanation provided in the May 29, 2012 response, the results of the cost estimates conducted for the CR 595 route and the Mulligan Plains West route are similar. The cost estimates are based on plans developed for both routes using standard engineering principles.

Though there is a relatively flat portion of the Mulligan Plains West route that runs along the west side of the Mulligan Plains for about six miles, the remaining portion has similar terrain to that of CR 595. Review of the quantities for earthwork (Attachment 1A) proves this to be true, as Mulligan Plains West has about $3.7M more in earthwork related quantities when compared to CR 595. Items that are strictly related to the overall length of the project are items such as Aggregate Base, Shoulders, and Hot Mix Asphalt. Since Mulligan Plains West is 2.4 miles longer than CR 595, it would be expected that Mulligan Plains West would be more costly than CR 595, and it is by $1.6M for these items.

4.0 Stream Crossing Revisions.

There are a number of revisions to the proposed stream crossings for CR 595 since the prior submittals to MDEQ. Due to these revisions, the CR 595 Stream Crossing Schedule has been

revised (Attachment 2). The revisions, not including the East Branch Salmon Trout River project, are as follows:

- The total length of the stream crossing structures proposed in the January 17, 2012 application for permit for CR 595 was 1,735 feet, which was in error and has now been corrected to 1,694 feet;

- The total length of the revised stream crossing structures for CR 595 is now 1,391 feet;

- The total length of existing bridges and culverts on roads/trails on the CR 595 route is 407 feet;

- The total length of streambed reconstruction proposed for CR 595 is 646 feet.

- Due to the revisions listed above, the comparison of stream crossing structures on the CR 510/Red Road/Sleepy Hollow alternative route has been revised. Given that CR 595 now has a total length of stream crossing structures of 1,391 feet, there would be 834 feet less on CR 595 than there would be for the total of 2,225 feet for the CR 510/Red Road/Sleepy Hollow route.

This revised stream crossing length information supersedes the related information provided in the response to the MDNR comments dated May 30, 2012, pages 8-10. Revised stream crossing detail drawings are included in Attachment 5.

5.0 Revisions to Wetland Impact for CR 595.

Revisions to the proposed wetland impacts for CR 595 have been made, as described below.

- The 0.4 acre of wetland impact attributed to the secondary impact to fragmented wetlands was not included in the total acreage of wetland impact in the January permit application. MCRC is committed to mitigating for those potential impacts. The 0.4 acre is now included in the wetland impact and accounted for in the mitigation plan.

- Due to the redesign of eight of the proposed stream crossings on CR 595, direct wetland impacts for the project have been reduced by 0.21 acre.

- Errors were found in calculations of the wetland impacts for wetlands A58 and B42 as reported in the original permit application. Adjusting for these errors increased the wetland impact by 0.06 acre.

- With the revisions described above, the total wetland impact for the CR 595 project has been revised from 25.81 acres to 26.06 acres.

6.0 Updated Costs for CR 595 that Include the Revisions Made to the Plans.

The costs for the CR 595 project have been revised as a result of changes in the project plans; e.g. revised bridges and culverts. The revised costs are provided in Attachment 2A dated May 29, 2012.

7.0 Revised Detail Drawings and Plan & Profile Drawings for CR 595.

The Detail Drawings (Sheets A-R) and the Plan & Profile Drawings for CR 595 have been revised and are included in Attachment 3. Some of the important modifications to the Detail Drawings are as follows:

- Sheet C: Drawing Legend – Hatch patterns depicting S3 Wetlands were added.

- Sheet E: Typical Peat Excavation – Peat excavation limits are shown to extend beyond the slope intercept line, to depict a scenario where there would be "temporary wetland impact". Peat excavation limits are based on MDOT standard.

- Sheet F, G, and H: Notes have been added to depict filling of voids in riprap to allow wildlife movement and reduce mortality of some species (e.g. turtles).

- Sheet K: Typical Groundwater Drainage Layer Detail – Peat excavation limits were extended beyond the slope intercept line to show a "temporary wetland impact" scenario (as described above similarly for Sheet E). Peat excavation limits are based on MDOT standard.

- Sheets L1, L2, and L3: Wetland impacts have been updated on these sheets.

The Plan & Profile Drawings have been revised; some of the more notable revisions are:

- S3 wetlands were added to the plans on all sheets (where applicable). Updates to the wetlands were calculated where S3 wetlands occurred and where culverts were shortened or where culverts were changed to bridges.

- Sheet 26: The span of the Dead River Conspan® bridge was changed from 24 feet to 32 feet in order to accommodate a Bankfull Width of 28.1 feet. This was an inadvertent error in the previous design for this crossing.

8.0 Evaluation of MNFI S3 Wetlands on the CR 595 Project

The Michigan Rapid Assessment Method for Wetlands (MiRAM) was used to conduct the functional assessment of wetlands on the proposed CR 595 route. A component of the MiRAM is to classify wetland community types using the Michigan Natural Features Inventory (MNFI) descriptions. The wetland community types are ranked by MNFI using the Global and State Element Ranking Criteria. Some of the wetlands that will be unavoidably impacted by CR 595 have a State of Michigan Rank of S3, which is defined as, *"Vulnerable in the state due to a restricted range, relatively few occurrences (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation."* The Plan & Profile Drawings for the CR 595 project have been revised (Attachment 3) to depict the location of the S3 ranked wetlands. The location and acres of the S3 wetlands impacted are shown on Table 3.

The CR 595 project would impact approximately 10.68 acres of wetlands ranked S3, which is approximately 41 percent of the 26.06 acres of total wetland impact. The S3 wetlands impacted by watershed are:

- Escanaba River watershed: 2.28 acres;
- Michigamme River watershed: 0.31 acres;
- Dead River watershed: 6.94 acres;
- Yellow Dog River watershed: 1.15 acres.

The predominant S3 wetland that is impacted by CR 595 is Hardwood Conifer Swamp. Hardwood Conifer Swamp is rated S3/G4 by MNFI. G4 is the Global Rank, which is defined by MNFI as, *"Apparently secure: uncommon but not rare; some cause for long-term concern due to declines or other factors."* The breakdown of the S3 wetlands impacted on the CR 595 project is as follows:

- 8.29 acres (78 percent) of the 10.68-acre total are Hardwood Conifer Swamp (S3/G4);
- 1.76 acres (16 percent) of the 10.68-acre total are Rich Conifer Swamp (S3/G4);
- 0.63 acres (6 percent) of the 10.68-acre total are Northern Hardwood Swamp (S3/G4).

TABLE 3. Spreadsheet of S3 Wetlands and Impact Proposed.

Community Type Acronym	*Wetland*	*Drawing Sheet*	*MNFI Designation*	*Community Type*	*Impact Acres*	*Watershed HU_10_NAME*	*Watershed Total S3 Acres*
HCS	KM3	16	S3/G4	Hardwood-Conifer Swamp	0.02	Dead River	
HCS	B40	29	S3/G4	Hardwood-Conifer Swamp	0.16	Dead River	
HCS	A15A	27	S3/G4	Hardwood-Conifer Swamp	0.18	Dead River	
HCS	A15A	27	S3/G4	Hardwood-Conifer Swamp	0.08	Dead River	
HCS	B3	32	S3/G4	Hardwood-Conifer Swamp	0.13	Dead River	
HCS	B9	32	S3/G4	Hardwood-Conifer Swamp	0.22	Dead River	
HCS	E8	23	S3/G4	Hardwood-Conifer Swamp	0.19	Dead River	
HCS	B33	30	S3/G4	Hardwood-Conifer Swamp	0.12	Dead River	
RCS	B38	29	S3/G4	Rich Conifer Swamp	0.29	Dead River	
HCS	A53	11	S3/G4	Hardwood-Conifer Swamp	0.52	Dead River	
HCS	A54	10	S3/G4	Hardwood-Conifer Swamp	0.37	Dead River	
HCS	A54	10	S3/G4	Hardwood-Conifer Swamp	0.06	Dead River	
HCS	A53	11	S3/G4	Hardwood-Conifer Swamp	0.40	Dead River	
HCS	A53	11	S3/G4	Hardwood-Conifer Swamp	0.06	Dead River	
RCS	E1	24	S3/G4	Rich Conifer Swamp	0.00	Dead River	
RCS	E1	24	S3/G4	Rich Conifer Swamp	0.19	Dead River	
HCS	E2	24	S3/G4	Hardwood-Conifer Swamp	0.38	Dead River	
RCS	E2	24	S3/G4	Rich Conifer Swamp	0.58	Dead River	
HCS	F6	11	S3/G4	Hardwood-Conifer Swamp	0.00	Dead River	
HCS	B11	31	S3/G4	Hardwood-Conifer Swamp	0.06	Dead River	**6.94**
HCS	B32	31	S3/G4	Hardwood-Conifer Swamp	0.02	Dead River	
HCS	B41	28	S3/G4	Hardwood-Conifer Swamp	0.13	Dead River	
HCS	B41	28	S3/G4	Hardwood-Conifer Swamp	0.00	Dead River	
HCS	B42	28	S3/G4	Hardwood-Conifer Swamp	0.06	Dead River	
HCS	B43	28	S3/G4	Hardwood-Conifer Swamp	0.11	Dead River	
HCS	E13	22	S3/G4	Hardwood-Conifer Swamp	0.27	Dead River	
HCS	M5	34	S3/G4	Hardwood-Conifer Swamp	0.15	Dead River	
HCS	A13	27	S3/G4	Hardwood-Conifer Swamp	0.42	Dead River	
HCS	B34B	30	S3/G4	Hardwood-Conifer Swamp	0.12	Dead River	
NHS	F8	11	S3/G4	Northern Hardwood Swamp	0.26	Dead River	
HCS	E23	18/19	S3/G4	Hardwood-Conifer Swamp	0.03	Dead River	
NHS	E23	18/19	S3/G4	Northern Hardwood Swamp	0.17	Dead River	
HCS	E23	18/19	S3/G4	Hardwood-Conifer Swamp	0.00	Dead River	
HCS	E20	20	S3/G4	Hardwood-Conifer Swamp	0.08	Dead River	
RCS	E2	24	S3/G4	Rich Conifer Swamp	0.14	Dead River	
HCS	B38	29	S3/G4	Hardwood-Conifer Swamp	0.08	Dead River	
HCS	B38	29	S3/G4	Hardwood-Conifer Swamp	0.07	Dead River	
RCS	B38	29	S3/G4	Rich Conifer Swamp	0.11	Dead River	

TABLE 3. Spreadsheet of S3 Wetlands and Impact Proposed (continued).

Community Type Acronym	*Wetland*	*Drawing Sheet*	*MNFI Designation*	*Community Type*	*Impact Acres*	*Watershed HU_10_NAME*	*Watershed Total S3 Acres*
HCS	BBB1	29	S3/G4	Hardwood-Conifer Swamp	0.11	Dead River	
HCS	BBB1	29	S3/G4	Hardwood-Conifer Swamp	0.12	Dead River	
RCS	B40	29	S3/G4	Rich Conifer Swamp	0.07	Dead River	
RCS	B37	30	S3/G4	Rich Conifer Swamp	0.23	Dead River	
HCS	B31	31	S3/G4	Hardwood-Conifer Swamp	0.10	Dead River	
HCS	B31	31	S3/G4	Hardwood-Conifer Swamp	0.03	Dead River	
HCS	B1	33	S3/G4	Hardwood-Conifer Swamp	0.01	Dead River	
HCS	A53	11	S3/G4	Hardwood-Conifer Swamp	0.02	Dead River	
HCS	E23	18	S3/G4	Hardwood-Conifer Swamp	0.14	Michigamme Creek	**0.31**
HCS	E23	18	S3/G4	Hardwood-Conifer Swamp	0.17	Michigamme Creek	
HCS	L2	36	S3/G4	Hardwood-Conifer Swamp	0.23	Yellow Dog River	
HCS	L2	36	S3/G4	Hardwood-Conifer Swamp	0.13	Yellow Dog River	
HCS	M10	34	S3/G4	Hardwood-Conifer Swamp	0.06	Yellow Dog River	
HCS	M11	34	S3/G4	Hardwood-Conifer Swamp	0.04	Yellow Dog River	**1.15**
HCS	M11	34	S3/G4	Hardwood-Conifer Swamp	0.29	Yellow Dog River	
HCS	L2	36	S3/G4	Hardwood-Conifer Swamp	0.20	Yellow Dog River	
HCS	L2	36	S3/G4	Hardwood-Conifer Swamp	0.10	Yellow Dog River	
HCS	L2	36	S3/G4	Hardwood-Conifer Swamp	0.11	Yellow Dog River	
HCS	E39	13/14	S3/G4	Hardwood-Conifer Swamp	0.10	Middle Branch Escanaba River	
HCS	KM7	15	S3/G4	Hardwood-Conifer Swamp	0.05	Middle Branch Escanaba River	
HCS	KM6	16	S3/G4	Hardwood-Conifer Swamp	0.06	Middle Branch Escanaba River	
HCS	KM7	15	S3/G4	Hardwood-Conifer Swamp	0.13	Middle Branch Escanaba River	
HCS	A58	9	S3/G4	Hardwood-Conifer Swamp	0.31	Middle Branch Escanaba River	
HCS	A54	10	S3/G4	Hardwood-Conifer Swamp	0.02	Middle Branch Escanaba River	
HCS	A57	9	S3/G4	Hardwood-Conifer Swamp	0.10	Middle Branch Escanaba River	**2.28**
HCS	A56	10	S3/G4	Hardwood-Conifer Swamp	0.18	Middle Branch Escanaba River	
HCS	M	14	S3/G4	Hardwood-Conifer Swamp	0.40	Middle Branch Escanaba River	
HCS	CC	12	S3/G4	Hardwood-Conifer Swamp	0.14	Middle Branch Escanaba River	

TABLE 3. Spreadsheet of S3 Wetlands and Impact Proposed (continued).

Community Type Acronym	*Wetland*	*Drawing Sheet*	*MNFI Designation*	*Community Type*	*Impact Acres*	*Watershed HU_10_NAME*	*Watershed Total S3 Acres*
HCS	A60	8/9	S3/G4	Hardwood-Conifer Swamp	0.14	Middle Branch Escanaba River	
HCS	A60	8/9	S3/G4	Hardwood-Conifer Swamp	0.05	Middle Branch Escanaba River	
RCS	A58	9	S3/G4	Rich Conifer Swamp	0.10	Middle Branch Escanaba River	
RCS	F13	12	S3/G4	Rich Conifer Swamp	0.05	Middle Branch Escanaba River	
HCS	F13	12	S3/G4	Hardwood-Conifer Swamp	0.01	Middle Branch Escanaba River	
HCS	F13	12	S3/G4	Hardwood-Conifer Swamp	0.03	Middle Branch Escanaba River	
NHS	E39	13/14	S3/G4	Northern Hardwood Swamp	0.20	Middle Branch Escanaba River	
HCS	L	15	S3/G4	Hardwood-Conifer Swamp	0.20	Middle Branch Escanaba River	
Total							**10.68**

9.0 Second River Stream Channel Stabilization Plan.

MDEQ commented that the proposed removal of three existing culverts at the Second River crossing of Wolf Lake Road and construction of a 58-foot span box beam bridge may cause the stream to lack a defined channel under the bridge. MCRC has evaluated the proposed Second River crossing in response to this comment.

The existing stream channel is braided into three channels at the crossing due to the prior installation of three culverts and some apparent channel excavation. Aerial photography from 1939 shows one stream channel through this crossing. The proposed bridge would cut off the two outside channels and create one channel under the bridge. Due to MDEQ concerns that the channel may lose its bank stability within the crossing area, MCRC has revised the plans for the Second River crossing to propose a bankfull width channel to be constructed and stabilized with rock. Consultation with MDNR and MDEQ may result in some additional specifications or plan changes for this crossing to address the channel stability concerns.

Revised bridge plans for the Second River crossing are included in Attachment 4.

10.0 Revisions to the Proposed Dead River Bridge.

Review of the stream crossing plans resulted in the discovery of an error in the size of the proposed Conspan® bridge over the Dead River (Plan & Profile drawing sheet 26). The bankfull width of the Dead River at this crossing is 28.1 feet. The bridge had been proposed to be 24

feet in width, but has now been revised to 32 feet in width to properly size the bridge according to the bankfull width plus additional over-bank area under the structure. The HEC-RAS model is being redone, after consultation with Susan Conradson, floodplain engineer with MDEQ, and will be provided to MDEQ as soon as it is completed. The revised bridge plans for the 32-foot wide Dead River crossing are included in Attachment 4.

11.0 Other Revisions to Bridge Plans.

Review of the bridge plan set also resulted in modification of the configuration of the proposed stream channels on some drawings to more accurately depict the reconstruction of the stream channels where that is necessary. On some bridges the stream will not be impacted; on others the construction of the abutments or footings may require some excavation in the stream.

12.0 Proposed Stream Mitigation for CR 595.

Proposed impacts to streams include enclosure of portions of streams with box culverts or bridges (i.e. stream fragmentation); excavation or relocation of existing natural streambed; and potential impacts to streams by introduction of sediment, road salt, or other contaminants. MCRC is responsible for describing the likely stream impacts from CR 595 and mitigating those impacts with proposed stream mitigation projects. The purpose of this section of this report is to describe those anticipated stream impacts and suggest potential mitigation projects.

All stream crossings as originally proposed have been reviewed by the project consulting team, and as a result revisions have been made on several crossings in response to Michigan Department of Natural Resources (MDNR) and MDEQ comments. The total combined length of proposed box culverts, width of Conspan® bridges, and width of box beam bridges for the 22 stream crossings on CR 595 (not including the East Branch Salmon Trout River crossing) has been reduced from the 1,694 feet as proposed in the January 17, 2012 application for permit, to 1,391 feet. This represents a reduction of 303 feet of enclosures, as a result of plan revisions. This shortening of the structure widths was accomplished by the use of higher headwalls and wingwalls on the stream crossings. In addition, two proposed box culvert crossings have been removed from the plans and replaced with bridges. Under the current plans, the total combined streambed that is proposed to be reconstructed due to the installation of the 22 stream crossing structures is 646 feet.

The linear feet of stream enclosed (i.e. structure lengths) and streambed reconstruction lengths are provided on the Stream Crossing Schedule dated June 4, 2012 (Attachment 2), which includes the East Branch Salmon Trout River at the bottom of the schedule. The potential impacts to streams involving sedimentation, salt, or other constituents in runoff are more difficult to quantify, but will be addressed.

The goal of the stream mitigation plan is to provide mitigation within the affected watershed; however, due to the type of projects being considered and the size of the projects, the goal of having all mitigation in-watershed will not likely be attained, as all suggested mitigation

alternatives are in the Lake Superior watershed. There are no stream mitigation projects currently being proposed for consideration in the Lake Michigan watershed (Escanaba River watershed stream impacts are in the Lake Michigan watershed). There are a number of significant stream restoration projects that can accomplish an appropriate level of stream mitigation.

12.1 Stream Habitat and Biological Integrity Assessment

In order to properly assess stream impacts, the stream habitat and functions were evaluated. One component of the ecological studies conducted for the proposed roadway was to conduct detailed assessments of the streams that would be crossed by CR 595. King & MacGregor Environmental (KME) biologists conducted stream surveys at or near the proposed crossing locations to determine the ecological condition of the streams using the MDEQ Great Lakes and Environmental Assessment Section (GLEAS) Procedure #51 (P-51) Guidelines. The full description of the stream surveys is provided in the January 17, 2012 application for permit in Appendix M of the Alternatives Assessment/Project Assessment (AA/PA). The P-51 surveys included analyzing water quality parameters (i.e. pH, water temperature, conductivity, and dissolved oxygen); scoring using 10 metrics to characterize habitat; collecting aquatic macroinvertebrates; and electrofishing to determine the assemblage of fish species in each stream. A GLEAS P-51 Biological Integrity rating for each stream was then determined from the scoring of the parameters surveyed.

Another stream assessment survey tool was used at the locations of the proposed stream crossings based upon methods described in Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings developed by the U.S. Department of Agriculture (U.S. Forest Service) in 2008. The full description of this assessment tool is provided in the January 17, 2012 application for permit in Appendix L of the AA/PA. This survey was done in consultation with MDEQ and MDNR personnel, with the results of the survey providing data to be used in designing the stream crossings; i.e. bridge/culvert sizes, slope of the stream, structure bury depth, stream substrate, location of pools and riffles, etc.

With the exception of two P-51 survey stations on the Middle Branch Escanaba River, all of the streams surveyed using P-51 rated either excellent or acceptable for the Biological Integrity rating and excellent or good for the Habitat Characterization rating. The only trout species caught during the stream surveys were brook trout, and then only in a few locations. The only streams where brook trout were caught were the Yellow Dog River (upstream about 400 feet from the proposed CR 595 crossing; no brook trout were caught at the existing road crossing), the Dead River (1), and the Second River (3). The Yellow Dog River was the only stream surveyed to be classified as a trout stream because trout comprised more than one percent of the fish caught in the survey. The remaining streams surveyed are warm water streams, but each of those streams have good/excellent habitat.

A summary of the pertinent data collected during the P-51 and Stream Simulation surveys is provided in Table 1.

Table 1. Pertinent Data Collected during P-51 and Stream Simulation Surveys.

Stream	P-51 Biological Integrity Rating	P-51 Habitat Characterization Rating	Average Bankfull Width	Proposed Structure Span[1]	Proposed Structure Type and Length[2]
Middle Branch Escanaba River	Poor-Acceptable	Marginal-Good	32.2’	60’	BBB, 34.25’
Second River[3]	Acceptable	Good	14.5’	58’	BBB, 34.25’
Trembath Lake Outlet	Not surveyed	Not surveyed	9.4’	12’	CBC, 73’
Unnamed Stream	Not surveyed	Not surveyed	4.7’	6’	CBC, 80’
Kipple Creek	Not surveyed	Not surveyed	10.2’	12’	CBC, 66’
Unnamed Tributary to Kipple Creek	Not surveyed	Not surveyed	NA	6’	CBC, 80’
Unnamed Tributary to Kipple Creek	Not surveyed	Not surveyed	3.8’	30’	BBB, 34.25’
Unnamed Tributary to Dishno Creek	Not surveyed	Not surveyed	4.3’	6’	CBC, 47’
Unnamed Tributary to Voelkers Creek	Not surveyed	Not surveyed	3.9’	30’	BBB, 34.25’
Voelkers Creek	Acceptable	Good	8.1’	10’	CBC, 61’
Dead River	Acceptable	Good	28.1’	32’	CS, 68’
Wildcat Canyon Creek	Acceptable	Good	NA	7’	CBC, 67’
Wildcat Canyon Creek	Excellent-Acceptable	Excellent-Acceptable	4.0’	6’	CBC, 80’
Unnamed Tributary to Wildcat Canyon Creek	Excellent-Acceptable	Excellent-Acceptable	2.6’	6’	CBC, 79’
Wildcat Canyon Creek	Excellent-Acceptable	Excellent-Acceptable	6.0’	8’	CBC, 80’
Unnamed Tributary to Mulligan Creek	Excellent	Excellent	8.3’	10’	CBC, 77’
Unnamed Tributary to Mulligan Creek	Excellent	Excellent	3.1’	6’	CBC, 70’
Unnamed Tributary to Mulligan Creek	Not surveyed	Not surveyed	2.5’	5’	CBC, 80’
Unnamed Tributary to Mulligan Creek	Not surveyed	Not surveyed	1.6’	4’	CBC, 80’
Unnamed Tributary to Mulligan Creek	Not surveyed	Not surveyed	NA	4’	CBC, 77’
Mulligan Creek	Acceptable	Good	14.4’	36’	CS, 54’
Yellow Dog River	Acceptable	Good	21.5’	55’	BBB, 34.25’

[1] Proposed structure span refers to the span of proposed box culverts and bridges.
[2] Length refers to the length of box culverts and the width of bridges (i.e. the feet of stream within the structures, parallel to the stream flow); BBB = box beam bridge; CS = Conspan®; CBC = concrete box culvert.
[3] The Second River P-51 Survey was conducted on the formerly proposed Woodland Road crossing north of CR FY; the Stream Simulation survey for Second River was conducted at the proposed crossing of CR 595.

12.2 Impacts of Proposed CR 595 Stream Crossings on Stream Functions

Impacts on stream functions can be short-term or long-term, depending on the type of impacts. Short-term impacts to stream functions usually occur during construction of road crossings (i.e. installation of box culverts, headwalls, and wingwalls), with many of the short-term impacts being unavoidable. Those impacts can be minimized by implementation of proper construction techniques, soil erosion control measures, and good construction design. Measures will be taken to minimize the short-term impacts.

Long-term impacts to streams are usually caused by improperly designed or installed stream crossing culverts, with bridges usually being much less impactful. Culverts that are undersized, not recessed into the streambed, or not installed on a proper slope usually continue to cause stream habitat degradation or serve to fragment stream habitat by being a barrier to fish movement. The impacts can increase over time and can extend further downstream in the form of sedimentation.

Long-term impacts as a result of stream crossings can be avoided if proper design and installation measures are implemented. The implementation of Stream Simulation Methodology is intended to provide geomorphological stream data that can be used to properly size stream crossing structures, to place the structures on the proper slope, and to establish the proper bury depth to ensure that any given stream crossing structure does not cause long-term damage to the stream. These measures also ensure that there is some area within the structure where wildlife can travel, thereby facilitating their movements. Scour caused by hydraulic head in undersized culverts is essentially eliminated with the proper sizing of stream crossing structures.

The proposed CR 595 involves 22 stream crossings (Attachment 1) with the stream crossings located within the Escanaba River, Dead River, and Yellow Dog River watersheds. Of the 22 proposed stream crossings, 15 are existing road/trail crossings with corrugated steel culverts, timber bridges, or steel beam bridges. All of these existing stream crossing structures are inadequate for the purposes of the proposed roadway, and are in need of replacement to improve the stream crossing. These 15 existing stream crossing structures enclose approximately 407 feet of stream.

The total of 1,391 feet for the revised stream crossing lengths results in a net increase of stream within structures of 984 feet over the length in existing structures (1,391 feet – 407 feet = 984 feet). Mitigation is proposed to address the additional 984 feet of stream that is within the 22 new stream crossing structures.

12.2.1 Stream Enclosures

The 984 feet of stream enclosures within a concrete box culvert, Conspan® bridge, or box beam bridge is an impact to the stream. The reduced daylight, vibrations from traffic, and reduction of stream bank vegetation are factors that affect aquatic organisms

in the stream and, in some cases, can be considered fragmentation of stream habitat if the stream crossing structure creates a barrier to fish or wildlife movements.

Measures that are proposed to minimize the impacts described above include:

- Designing the bridge or box culvert length to be as narrow as possible, which is affected by the type of structure, road elevation above the stream, and the horizontal alignment of the road at the stream crossing;

- Over-sizing the stream crossing structures as guided by Stream Simulation Methodology to provide for stream banks to be established within the structures;

- Providing as much light as possible within each crossing using the measures described in the above two bullet points;

- Reconstructing the streambed and banks within each stream crossing structure, including using streambed material that is similar to that in the stream and use of smaller stone to fill voids within the larger riprap that is used to prevent erosion and construct the stream banks within the structures.

12.2.2 Excavation or Relocation of Existing Natural Streambed

Construction and installation of the proposed 22 stream crossing structures will require the excavation or relocation of 646 feet of streambed beyond the limits of the actual structure placement (Attachment 1). For example, installation of a bridge or box culvert requires excavation of the stream banks and, in some cases, the streambed in order to construct footings, headwalls, wingwalls, and to key in riprap for erosion and scour protection. In addition, the natural streambed does not always allow the installation of a box culvert due to stream sinuosity. The box culvert locations where the existing stream channel will be relocated within the proposed box culvert are E99, D29, D44, D48, D57, D60, D61, and D64 (locations provided in Attachment 1). These activities constitute the 646 feet of streambed disturbance.

The relocation or excavation of the natural streambed will have temporary impacts on the stream during construction, and possibly for some time period after construction. The impacts during construction may include:

- Sediment being introduced into the stream by excavation activities;

- Removal of aquatic invertebrates and their habitat and potential mortality to fish;

- Reduction of the total length of streambed that can result from the relocation or straightening of a stream channel;

- Creation of inadvertent barriers or deterrents to fish and wildlife species movements during construction, which could disrupt breeding, rearing of young,

or dispersal. The time of year of the construction can cause varying effects on fish and wildlife.

- Reduction of food supply for aquatic invertebrates until such time that detrital material or other food sources become available in the new stream sections and reduction of food for fish until such time as the aquatic invertebrates recolonize the stream bottom. The time of year of the construction can impact these factors differently.

Some of the short-term impacts described above are unavoidable and difficult to mitigate, but measures can and will be implemented during construction to minimize the impacts.

12.2.3 Introduction of Sediment, Road Salt, or Other Contaminants

Construction of roads over streams will often have impacts in the form of introduction of sediment, road salt, or other contaminants to the streams.

CR 595 has been designed to minimize the effects of these factors with the implementation of the following measures:

- The entire road will be paved, which will reduce sedimentation into the streams substantially compared to a gravel roadway;

- The grade of the road has been designed to prevent stormwater runoff from dumping directly into streams by moving stormwater outfalls away from streams to the extent allowed by the topography at each of the stream crossings;

- The roadbed will be designed at stream crossings to include curbing which will serve to direct runoff to outfalls away from the streams;

- The use of road salt will be judiciously utilized, as is the standard practice of MCRC; alternative de-icing products are under consideration;

- Properly located stormwater outfalls, as shown on the Plan & Profile Drawings by reference numbers in the Runoff Plan Legend on each plan sheet, with detail drawings of the measures provided on Detail Sheets F and G.

The unavoidable impacts to streams are proposed to be mitigated as described in the following section.

12.3 Mitigation of Unavoidable Stream Impacts

As described in the application for permit and subsequent submittals, MCRC has taken extensive measures in the design of the stream crossings on the proposed CR 595 to avoid and minimize impacts to streams. The most recent redesign of the proposed stream crossings was conducted to minimize the impacts on streams by reducing the length of box culverts, increasing the size of some structures, and proposing bridges in place of box culverts. The potential impacts to streams have been avoided and minimized to the extent that is practical; the unavoidable stream impacts will be compensated with mitigation measures as proposed in this section.

A menu of stream mitigation projects has been provided to allow MDEQ/MDNR to consider the most appropriate project(s). The following menu of projects constitutes what is believed to be in excess of what would be required to adequately compensate for the stream impacts, allowing for flexibility in formulating a plan from the menu of options. If additional documentation or details are required by MDEQ, MDNR, or EPA for any of the options selected, the information will be provided.

1. East Branch Salmon Trout River (EBSTR) Restoration

   This project involves the relocation of about 0.8 mile of Triple A Road, removal of three corrugated steel culverts and construction of a 65-foot span bridge over the stream. The project would result in the restoration of 1,637 linear feet of stream accomplished by the removal of the three culverts and removal of 2,783 linear feet of Triple A Road. The project plans were included with the application for permit in Attachment H to the Alternatives Analysis/Project Assessment. A more detailed plan of the measures proposed for the East Branch Salmon Trout River restoration has also been prepared for this submittal (Attachment 6).

2. Partridge Creek Restoration Project

   The Partridge Creek project would include the restoration of approximately 2,000 linear feet of stream that is presently enclosed in a storm sewer and is part of the overall stormwater project by the City of Ishpeming. The subject reach of stream would be located from the end of the stormwater sewer outfall (which presently contains Partridge Creek) just south of Washington Street and would connect to Carp Creek north of Washington Street. If this project is selected by MDEQ as a component of the stream mitigation package, MCRC would determine, through coordination with the City of Ishpeming, what opportunities exist for participating in this project.

   This project would provide approximately 2,000 linear feet of new stream channel that would provide habitat for aquatic invertebrates, fish, and wildlife species in/near an urbanized area.

3. Paving to Control Introduction of Sediment into Streams on CR 510

   MCRC previously participated with MDEQ in 2001 to seek grants for paving two sections of CR 510 for the purpose of reducing the substantial sediment load that appeared to be occurring from road maintenance and road runoff. The streams involved are in close proximity to CR 510 (which is an unpaved road in these areas). The two segments that would be paved are described below.

   a. CR 510 at Big Garlic River, T49N-R27W Section 4; 0.7 mile of road would be paved at this location.

   b. CR 510 at Yellow Dog River, T50N-R27W Section 17; 0.2 mile of roadway would be paved at this location.

4. Culvert Replacements

   Culvert replacements to correct existing, improperly installed culverts, undersized culverts, or other existing conditions that are causing negative effects to downstream habitat and/or upstream movement of fish could be implemented. MCRC has identified the following culvert locations that would provide substantial upgrades to the existing stream crossings, and therefore reduce ongoing impacts to streams.

   a. CR GO over Barnhardt Creek – T48N R27W Section 6

   b. CR BF (Karen Rd) over Big Creek – T47N R24W Section 32

   c. CR BA (Cherry Creek Rd) over Cedar Creek – T47N R24W Section 19

   d. CR AAT (Red Road) over Silver Creek – T49N R28W Section 25

   e. CR HK over Compeau Creek – T48N R25W Section 5

   f. CR HD over Compeau Creek – T48N R25W Section 6

12.4 Performance Standards for Evaluation of Stream Mitigation Projects

The proposed stream mitigation projects (as may be selected by MDEQ from the proposed menu of projects) will meet certain performance standards to verify the success of the projects in attaining the goals established for each project. Each project will have uniquely different goals and performance standards. The proposed project activities and goals and performance standards for each project listed in the menu in this document are provided below.

12.4.1 East Branch Salmon Trout River Restoration Project

Project Activities and Goals:

1. Relocate Triple A Road away from the stream to substantially reduce sediment being introduced into the stream from daily traffic, routine maintenance, and runoff.

2. Remove three existing corrugated metal pipe culverts and replace with a 65-foot span bridge to remove barriers to fish movements and sources of scour and sedimentation presently being caused by the three culverts. The three existing culvert crossings will be removed and the road bed fill removed to provide a suitable stream width through these areas to ensure free flow of the stream at all water elevations.

3. Design the proposed bridge to span the stream, which will allow construction to take place without disturbance of the existing stream or stream banks. Implement construction measures to ensure that the stream is not impacted during construction.

4. Remove the existing roadbed, place topsoil, and seed to permanently stabilize the site and prevent future erosion into the stream. Barriers should be placed to discourage travel on the abandoned road section by ATVs or snowmobiles.

Performance Standards:

1. Sediment inputs into the stream have been significantly reduced with the removal of the existing culverts and obliteration of a portion of the existing Triple A Road that is adjacent to or near the stream.

2. The stream has natural free-flow during all runoff stages and stream erosion is not being caused by the new bridge.

3. Runoff from the proposed relocated Triple A Road is not entering directly into the stream, but rather is directed away from the stream into uplands.

12.4.2 Partridge Creek Restoration Project

Note: MCRC's role in this project may vary from the plan presented in this preliminary stream mitigation plan.

Project Activities and Goals:

1. Construct approximately 2,000 linear feet of new stream channel from the outlet of the new City of Ishpeming stormwater/creek enclosure outlet to Carp Creek using natural stream channel design to maximize stream habitat.

2. Construct the new channel with construction practices that minimize the introduction of sediment into the stream.

3. Properly stabilize the stream banks with native plant species.

4. Conduct pre-construction and post-construction stream habitat analysis for three years after construction in an attempt to discern any visible or measurable changes in the stream habitat.

Performance Standards:

1. The new stream channel will be constructed in compliance with the construction plans to be developed by others.

2. Stabilization practices are effective such that soil erosion into the new stream channel is minimal.

12.4.3 Paving to Control Introduction of Sediment into Portions of Two Streams on CR 510

Project Activities and Goals:

1. Install asphalt pavement to substantially reduce the sediment load being introduced into the Big Garlic River and/or the Yellow Dog River that presently exists from routine road maintenance (i.e. grading) and runoff from the roadway that is adjacent to the streams.

2. Stabilize the stream banks where appropriate with shrub live stakes and seeding.

Performance Standards:

1. Monitor the sand bedload in the stream(s) and the presence of any obvious stream bank erosion in the new paving section to determine whethersand bedload is being reduced.

2. Conduct pre-paving and post-paving stream habitat analysis for three years after construction in an attempt to discern any visible or measurable changes in the stream habitat.

12.4.4 Culvert Replacements

Project Activities and Goals:

1. To replace culverts that have been identified as having long-term deleterious effects on the stream with properly designed culverts or bridges that will not cause degradation of the stream.

2. Focus on the highest priority structures first in coordination with MDEQ and MDNR in order to maximize the funds spent on these projects.

Performance Standards:

1. The impacts to each stream that were identified in the project selection coordination have been corrected and mitigated for the long term.

13.0 Wetland Mitigation Plan for CR 595.

The wetland mitigation plan included in the application submitted to the Michigan Department of Environmental Quality (MDEQ) on January 17, 2012 (MDEQ File No. 11-52-75-P) by the Marquette County Road Commission (MCRC) for the proposed CR 595 is in the process of being revised based upon comments received from MDEQ and the Environmental Protection Agency (EPA). The purpose of this document is to propose several alternative mitigation concept options, including most importantly the preservation of high quality forested wetland systems with upland buffers.

The proposed wetland mitigation concept in the January 17, 2012 application for permit is wetland creation from uplands. An extensive amount of work was conducted to determine the location of the groundwater table at these wetland creation mitigation sites. Several years of groundwater table elevation data have been obtained to utilize in the design of the proposed created wetlands. In addition, wetland preservation is now being proposed as a component of the overall mitigation plan.

The possible components of the proposed wetland mitigation plan are explained in the following sections of this revised plan. MCRC is suggesting that these components be considered as a menu of options that MDEQ/EPA can consider to assemble an appropriate wetland mitigation plan. Once the components of the wetland mitigation plan are reviewed and accepted by MDEQ/EPA as being potentially appropriate, MCRC will provide additional mitigation plan details for each component as required.

The goals and objectives of the revised wetland mitigation plan are intended to address the following mitigation components:

- Provide compensatory mitigation based on the identified functions of wetlands that will be unavoidably impacted by the proposed CR 595;

- Limit wetland creation to compensate only for proposed impact to emergent, scrub-shrub and low quality wetlands;

- Provide preservation of wetlands with high functional value and/or identified unique habitat characteristics that are classified as vulnerable on a state or global basis to compensate for proposed forested and high quality wetland impacts;

- Provide mitigation in-watershed and in-kind to the extent possible.

It is understood that prior to MDEQ finally approving any of these options, MCRC will provide the following:

- A list of functions of the impacted wetlands;

- Cross-section drawings of proposed creation areas;

- Description of the functions the created wetlands will provide and baseline conditions at the wetland creation sites;

- Performance standards to replace lost wetland functions.

For preservation areas, MCRC will provide a baseline assessment for all selected sites and provide a monitoring plan for preserved wetlands, including invasive species control. All mitigation areas will be protected by a Conservation Easement.

13.1 Wetland Functions

Construction of the proposed CR 595 will impact 26.06 acres of wetland, including the Trail 5 relocation and the EBSTR project. These wetlands have been evaluated based on habitat type (forested, shrub-scrub and emergent), functional value using the Michigan Rapid Assessment Methodology (MiRAM), and habitat characterization using Michigan Natural Features Inventory (MNFI) Natural Community definitions. The methods used to conduct these evaluations and findings are provided in the application for permit and summarized in the attachments to this document. Generally, when assessing the functional value of wetlands that are proposed to be impacted or preserved as part of the mitigation plan, MCRC used MiRAM and MNFI criteria.

The MiRAM scoring methodology requires that a knowledgeable biologist score each wetland on several different metrics including:

- Wetland size and distribution;

- Upland buffers and intensity of surrounding land uses;

- Hydrology;

- Habitat alteration and habitat structure development;

- Special situations;

- Vegetation interspersion and habitat features; and,

- Scenic, recreational and cultural value.

In the Upper Peninsula, MiRAM scores of less than 40 generally indicate low wetland functional value, MiRAM scores between 41 and 69 generally indicate moderate wetland function, and MiRAM scores of 70 and over generally indicate high wetland functional value. Typically, in order to score above 70, a wetland complex must provide diverse habitat, groundwater recharge, hydrologic conveyance, and/or contain rare species.

Of the 70 MiRAM wetland evaluation areas that were rated within the CR 595 project area, 34 wetlands scored within the high wetland functional value range (48.5%); thirty-three MiRAM wetland evaluation areas scored within the moderate wetland functional value range (47%); and three MiRAM wetland scoring areas scored within the low functional value range (4.5%).

MiRAM datasheets and photographs are provided in Attachments 7 and 8, respectively.

13.2 Wetland Mitigation Options by Watershed

Since wetland mitigation can occur either by creation of new wetlands or by preservation, both options are offered in this section with appropriate ratios described. Wetland mitigation provided through preservation of existing high quality wetland utilized the following site selection considerations to identify the candidate wetland preservation areas:

- Location in appropriate watershed;
- MiRAM scoring over 70;
- S3/G4 (or lower) habitat present;
- Riparian corridor with diverse habitat;
- Rare species present;
- High probability a conservation easement could be obtained.

The overall wetland impact for the CR 595 project is 26.06 acres. Given that the mitigation ratio using preservation is 10:1 under provisions of Part 303, a total of 260.6 acres of wetland would be the minimum preservation acreage required, provided that no wetland creation occurs as part of the mitigation plan or any reduction of the mitigation requirement is provided by MDEQ.

The candidate wetland preservation area location maps (Attachment 9) are included.

13.2.1 Escanaba River Watershed

Summary of proposed wetland impacts (7.8 acres):

- 2.14 acres of emergent wetland (if creation, requires 3.21 acres mitigation @ 1.5:1);
- 0.40 acres of scrub-shrub wetland (if creation, requires 0.60 acres mitigation @ 1.5:1);
- 5.23 acres of forested wetland;

- Total mitigation needed for emergent and scrub-shrub wetlands with creation would be 3.81 acres;

- Total mitigation needed if preservation is used would be 78 acres.

Candidate Wetland Mitigation Areas by Creation for the Escanaba River Watershed:

Peterson-Holli Site

The Peterson-Holli wetland mitigation site as presented in the application for permit was originally designed to provide approximately 23.9 acres of wetland mitigation within the Escanaba River watershed, and could be redesigned to provide 3.81 acres of created wetland.

Humboldt Wetland Mitigation Bank

Ten acres of forested wetland creation has been created at the Humboldt Wetland Mitigation Bank in Section 2, T47N-R29W. This wetland construction is presently being completed (i.e. on-going planting of upland slopes; the wetland has been planted).

Candidate Wetland Mitigation Areas by Preservation for the Escanaba River Watershed:

The locations of the candidate wetland preservation areas are shown on Attachment 9.

Candidate Wetland Preservation Area 1
Poor Fen Sta. 382+00 (Wetland A54); Plan Sheet 10

MiRAM Complex 16 Score: 79.5
MNFI S3/G4 Community Present: Yes
Riparian Corridor: No
Rare Species: Not identified to date
Ownership: Plum Creek

Candidate Wetland Preservation Area 2
Hardwood Conifer Swamp/Rich Conifer Swamp at Sta. 452+00 (Wetland F13) Plan Sheet 12

MiRAM Complex 706 Score: 87
MNFI S3/G4 Community Present: Yes
Riparian Corridor: Kipple Creek
Rare Species: Not identified to-date
Ownership: Plum Creek

Candidate Wetland Preservation Area 3
Hardwood Conifer Swamp at Sta. 490+00 (Wetland E39) Plan Sheet 14

MiRAM Complex 708 Score: 77
MNFI S3/G4 Community Present: Yes
Riparian Corridor: Tributary to Kipple Creek
Rare Species: Not identified to-date
Ownership: Plum Creek

13.2.2 Michigamme River Watershed

Summary of wetland impacts:

- 0.63 acres of forested wetland;
- Total mitigation needed if preservation is used would be 6.3 acres.

Candidate Wetland Mitigation Area by Preservation for the Michigamme River Watershed:

Candidate Wetland Preservation Area 4
Hardwood Conifer Swamp at Sta. 1130+00 (Wetland E23) Plan Sheet 18

MiRAM Complex 34 Score: 78
MNFI S3/G4 Community Present: Yes
Riparian Corridor: None
Rare Species: Not identified to-date
Ownership: Plum Creek

13.2.3 Dead River Watershed

Summary of wetland impacts (13.9 acres):

- 2.38 acres of emergent wetland (requires 3.57 acres of mitigation @ 1.5:1);
- 0.20 acres of scrub-shrub wetland (requires 0.30 acres of mitigation @ 1.5:1);
- 11.32 acres of forested wetland;
- Total mitigation needed for emergent and scrub-shrub wetlands with creation would be 3.87 acres;
- Total mitigation needed if preservation is used would be 139 acres.

Candidate Wetland Mitigation Areas by Creation for the Dead River Watershed:

Brocky Lake East Site

The Brocky Lake East wetland mitigation site proposed in the application for permit was originally designed to provide 3.5 acres of forested wetland and could be redesigned to provide 3.5 acres or more of created emergent and scrub-shrub wetland.

Connors Creek Site

The Connors Creek mitigation site proposed in the application for permit was originally designed to provide approximately 8.3 acres of wetland mitigation and could be redesigned to provide 3.87 acres of created emergent and scrub-shrub wetland.

Candidate Wetland Mitigation Areas by Preservation for the Dead River Watershed:

Candidate Wetland Preservation Area 5
Rich Conifer Swamp at Sta. 1299+00 to Sta. 1315+00 (Wetland E1) Plan Sheet 24

MiRAM Complex 43 Score: 73
MNFI S3/G4 Community Present: Yes
Riparian Corridor: Voelkers Creek
Rare Species: Not identified to date
Ownership: GMO

Candidate Wetland Preservation Area 6
Wildcat Canyon Creek Corridor Sta. 1398+00 (Wetland A15) Plan Sheet 27

MiRAM Complex 49 Score: 79
MNFI S3/G4 Community Present: No
Riparian Corridor: Wildcat Canyon Creek
Rare Species: Narrow-leaved Gentian
Ownership: GMO

Candidate Wetland Preservation Area 7
Poor Fen/Hardwood Conifer Swamp at Sta. 1444+00 (Wetland B40) Plan Sheet 29

MiRAM Complex 50 Score: 82.5
MNFI S3/G4 Community Present: Yes
Riparian Corridor: None
Rare Species: Narrow-leaved Gentian
Ownership: GMO

Candidate Wetland Preservation Area 8
Mulligan Creek Riparian Corridor Sta. 1564+00 (Wetland B1) Plan Sheet 33

MiRAM Complex 61 Score: 87
MNFI S3/G4 Community Present: Yes
Riparian Corridor: Mulligan Creek
Rare Species: Narrow-leaved Gentian
Ownership: Plum Creek

Snowfield Road MCRC Wetland Mitigation Site

This site is adjacent to the wetland mitigation site created for the CR 510 bridge project near the old airport in Negaunee Township.

- Preservation of approximately 14 acres of wetland adjacent to an existing MCRC wetland creation/mitigation site in an area of residential development;
- MCRC would likely sell the land if not preserved and could be developed or impacted;
- If selected, a wetland delineation would be conducted on the 14-acre parcel to determine potential mitigation credit.

13.2.4 Yellow Dog River Watershed

Wetland impacts in the Yellow Dog River watershed (3.0 acres):

- 0.91 acres of emergent wetland (requires 1.37 acres of mitigation @ 1.5:1);
- 2.09 acres of forested wetland;
- Total mitigation needed for emergent and scrub-shrub wetlands with creation would be 1.37 acres.
- Total mitigation needed if preservation is used would be 30 acres.

Candidate Wetland Mitigation by Creation for the Yellow Dog River Watershed:

Yellow Dog River Site

The Yellow Dog River wetland mitigation site as presented in the application for permit was designed to provide approximately 8.1 acres of wetland mitigation, and could be redesigned to provide 1.37 acres of created emergent wetland.

Candidate Mitigation Areas by Preservation for the Yellow Dog River Watershed:

Candidate Wetland Preservation Area 9
Muskeg at Sta. 1665+00 (Wetland L2) Plan Sheet 36

MiRAM Complex 72 Score: 81.5
MNFI S3/G4 Community Present: Yes
Riparian Corridor: None
Rare Species: Narrow-leafed Gentian
Ownership: KEMC

Candidate Wetland Preservation Area 10
Muskeg and northern shrub thicket on Yellow Dog River, Sections 13 & 14, T50N-R29W

MiRAM Complex n/a Score: Not scored.
MNFI S3/G4 Community Present: Yes
Riparian Corridor: Yellow Dog
Rare Species: Narrow-leafed Gentian
Ownership: Longyear/KEMC

A Baseline Ecological Survey Report – Yellow Dog River Preservation Corridor was completed in 2010 and a portion of Candidate Wetland Preservation Area 10 is within that area.

14.0 Attachments (provided on CD)

Attachment A. CR 595 Peat Excavation Wetland Cross Section Summary, June 4, 2012

Attachment 1. Detail Sheet E, Typical Peat Excavation

Attachment 1A. Quantities and Cost Spreadsheet for Mulligan Plains West and CR 595

Attachment 2. Revised CR 595 Stream Crossing Schedule, June 4, 2012

Attachment 2A. Revised Preliminary Quantities for CR 595, May 29, 2012.

Attachment 3. Revised Plan & Profile Details and Drawings for CR 595

Attachment 4. Revised Bridge Plans

Attachment 5. Revised Stream Crossing Drawings, June 6, 2012

Attachment 6. EBSTR Restoration Revised Plans, June 6, 2012

Attachment 7. MiRAM Datasheets

Attachment 8. Photographs of MiRAM Areas

Attachment 9. Candidate Wetland Preservation Area Figures